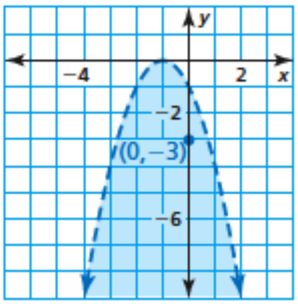
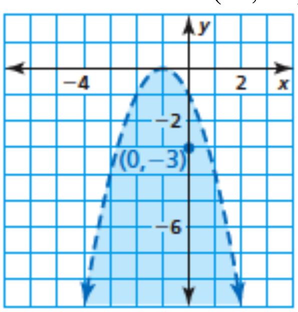
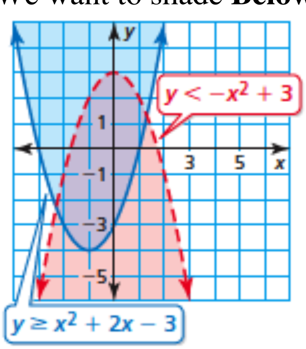
Graph: $f(x) < -x^2 - 2x - 1$
Solution:
We want to shade everything **below** the parabola, $f(x) = -x^2 - 2x - 1$.
Rewrite in Vertex Form: $f(x) = -\left(x^2 + 2x + 1\right) - 1 + 1 = -\left(x + 1\right)^2$
The Vertex is at (-1, 0) and the graph opens downward. Also since the inequality is strictly "Less Than", we **cannot** use the parabola itself. To show this, the parabola is graphed with a broken curve. We can choose a test point such as (0, -3) to see if it satisfies the inequalities. $-3 < -0^2 - 2(0) - 1 \rightarrow -3 < -1$ True. This means that we can shade the portion of the coordinate plane that contains (0, -3).



Graph: $f(x) > -x^2 - 2x + 15$
Solution:
We want to shade everything **above** $f(x) > -\left(x^2 + 2x + 1\right) + 15 + 1 = -\left(x + 1\right)^2 + 16$
The Vertex is at (-1, 16) and the graph opens downward.



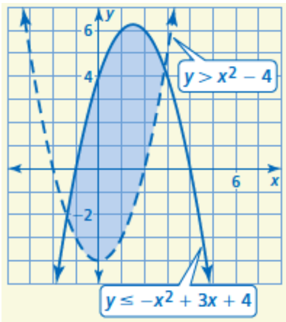
Graph: $\begin{cases} y < -x^2 + 3 \\ y \geq x^2 + 2x - 3 \end{cases}$
Solution:
We want to shade **Below** the 1st graph while <u>at the same time</u> **Above** and including the 2nd graph.



In this figure the actual graph is the darker region.

Graph: $\begin{cases} y > x^2 - 4 \\ y \le -x^2 + 3x + 4 \end{cases}$

Solution:



Solve the following Quadratic Inequality in one variable: $x^2 + 4x - 32 > 0$ This has only **one variable x**. So all answers are somewhere on the x-axis **inside** or **outside** the x-intercepts of the parabola: $y = x^2 + 4x - 32$

Solution:

Intercept Form is $y = (x+8)(x-4)$ So the **Critical Values** are -8 & 4. Pick test value below -8, between -8 and 4, and above 4. If a test value makes the sentence true, then everything on that interval is a solution. If not, then nothing in that interval is a solution. In this problem we can pick test numbers -10, 2, and 5. -10 and 5 are solutions. Therefore the total solution is: x < -8 or x > 4.

Solve: $x^2 + 8x + 12 > 0$

Solution:

Factoring to find the **Critical Values**, we get (x + 6)(x + 2) > 0. The Critical Values are -6 and -2. We can pick test values -8, -4, and 10. -8 and 10 are solutions, but -4 is not.

The total solution is: x < -6 or x > -2.

Typically, when the leading coefficient is positive and the quadratic is greater than zero, we will shade outside the critical values. When the leading coefficient is positive and the quadratic is less than zero, we will shade inside the critical values. If the leading coefficient is not positive, multiply both sides by -1 then continue as we did before.

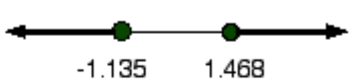
Solve and Graph: $3x^2 - x - 5 \ge 0$ When Graphing, Open Circles are values that are approached, but not used. Closed Circles are values that are approached, but used.

Solution:

This cannot be factored so we must use the Quadratic Formula to find the **Critical Values** (x-intercepts).

$\frac{1 \pm \sqrt{1 - 4(3)(-5)}}{6} = \frac{1 \pm \sqrt{61}}{6}$ = -1.135 or 1.468. So we shade on the x-axis Outside those values.

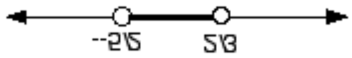
The Solution: x ≤ -1.135 or x ≥ 1.468



Solve and Graph: $6x^2 + 11x - 10 < 0$

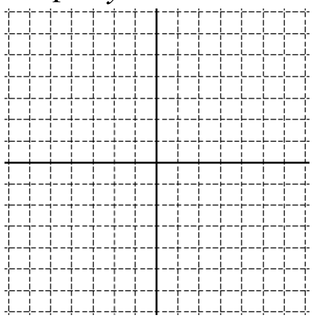
Solution:

(2x + 5)(3x – 2) < 0 The Critical Values are -5/2 and 2/3. The solution is -5/2 < x < 2/3.

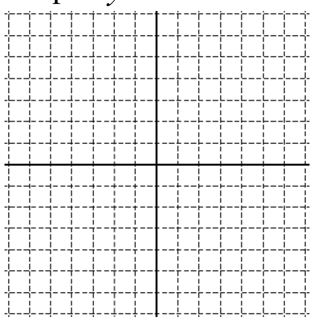


Algebra 2 Assignment 135 Friday November 13 2015 Hour Name

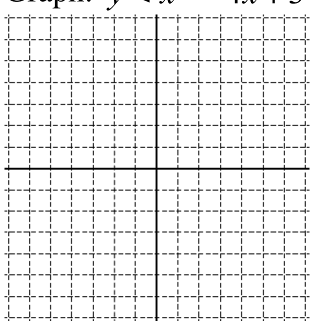
1. Graph: $y \le x^2 + 4x + 3$



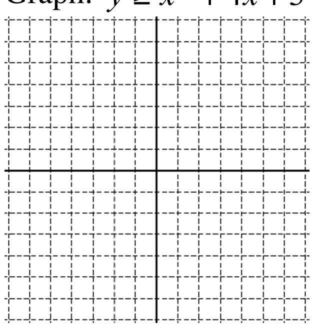
2. Graph: $y > -x^2 + 4x - 3$



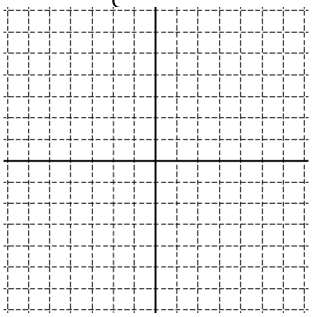
3. Graph: $y < x^2 - 4x + 3$



4. Graph: $y \ge x^2 + 4x + 3$



5. Graph: $\begin{cases} y < -x^2 + 1 \\ y > x^2 + 2x - 5 \end{cases}$



6. Solve: $x^2 + 10x + 9 < 0$

7. Solve: $x^2 - 11x \geq -28$

8. Solve: $3x^2 - 13x > -10$

9. $4x^2 + 8x - 21 \geq 0$

10. Graph The Solution: $-2x^2 + 7x - 6 < 0$

11. Graph The Solution: $-4x^2 + 8x - 3 > 0$

12. Graph The Solution: $x^2 - 2x - 3 \leq 0$

13. Graph The Solution: $x^2 + 8x + 7 \geq 0$